Expert Systems with Applications

An International Journal

LIST OF CONTENTS
AND
AUTHOR INDEX
VOLUME 12, 1997

Pergamon

EXPERT SYSTEMS WITH APPLICATIONS

An International Journal

EDITOR-IN-CHIEF

Jay Liebowitz, D.Sc.
Department of Management Science
George Washington University
Washington, DC 20052, USA

EDITORIAL ADVISORY BOARD

Edward Feigenbaum
Stanford University, USA

Lance B. Eliot
University of Southern California, USA

Y. T. Chien
National Science Foundation, USA

Dianne C. Berry
University of Reading, UK

Walter Reitman
Rensselaer Polytechnic Institute, USA

Shri K. Goyal
GTE Laboratories, USA

Daniel E. O'Leary
University of Southern California, USA

Richard G. Vedder
University of North Texas, USA

James L. Rash
NASA Goddard Space Flight Center, USA

Louis L. Odette
Applied Expert Systems, Inc., USA

Randall Shumaker
Naval Research Laboratory, USA

David Bendel Hertz
University of Miami, USA

A. Desai Narasimhalu
National University of Singapore

Patricia Lightfoot
NASA Goddard Space Flight Center, USA

Larry Harris
AI Corporation, USA

Mark Fox
Toronto, Ontario, Canada

Jae Kyu Lee
Korea Advanced Institute of Science and Technology

I. Burhan Turksen
University of Toronto, Canada

David J. Gorney
Rawson Technologies, Inc., USA

Ernest H. Forman
George Washington University, USA

David King
Execucom Systems, USA

Roar Fjellheim
Computas Expert Systems, Norway

Milton White
Datanamics Inc., USA

Jon R. Wright
AT&T Bell Laboratories, USA

Roy Rada
University of Liverpool, England

John P. Coyne
George Washington University, USA

John H. Carson
George Washington University, USA

Daniel Schutzer
Citicorp Investment Bank, USA

Paul Harmon
Harmon Associates, USA

Francisco J. Cantu
Instituto Tecnologico y de Estudios Superiores de Monterrey, Mexico

Masao Matsumoto
NEC Corporation, Japan

Patrick F. Perez
Neuron Data, USA

Brian Gaines
University of Calgary, Canada

Peter E. Hart
Syntelligence, USA

Michel Clerget
Cognitech, France

Kenneth J. Fordyce
IBM, USA

James R. Slagle
University of Minnesota, USA

Eliot Weinman
Software Productivity, USA

Randall Davis
Massachusetts Institute of Technology, USA

E. Balagurusamy
PSG Institute of Management, Peelamedu, India

Steven H. Kim
Massachusetts Institute of Technology, USA

Dieter Specht
Technische Universitat Cottbus, Germany

Vladimir Milacic
University of Belgrade, Yugoslavia

N. Rao Machiraju
Apple Computer, Inc., USA

Hans Bergkvist
ATTEXOR S. A., Switzerland

Laura C. Davis
U.S. Navy Center for Applied Research in Artificial Intelligence, USA

Jerald Feinstein
MITRE, USA

Efraim Turban
California State University–Long Beach, USA

Bernt Bremdal
GeoKnowledge, Norway

Juan Pazos
Universidad Politecnica de Madrid, Spain

Publishing Office: Elsevier Science Ltd, Bampfylde Street, Exeter EX1 2AH, UK [*Tel.* (01392) 51558; *Fax:* (01392) 425370].

Editorial Office: Jay Liebowitz, School of Government and Business Administration, Department of Management Science, George Washington University, Washington, DC 20052, USA.

Advertising Office: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK [*Tel.* (01865) 843000; *Fax* (01865) 843010].

Publishing Eight Issues in 1997. *Annual Institutional Subscription Rates 1997:* Europe, The CIS and Japan, NLG 2085.00; all other countries, US$1287.00. Associated Personal Subscription rates are available on request for those whose institutions are library subscribers. Dutch Guilders prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance and are subject to change without notice.

Any enquiries relating to subscriptions should be sent to:

The Americas: Elsevier Science Customer Support Department, P.O. Box 945, New York, NY 10010, USA [*Tel.:* (+1)212-633-3730/1-888 4ES-INFO; *Fax:* (+1)212-633-3680; *e-mail:* usinfo-f@elsevier.com].

Japan: Elsevier Science Customer Support Department, 9–15 Higashi-Azabu 1-chome, Minato-ku, Tokyo 106, Japan [*Tel.:* (+81)3-5561-5033; *Fax:* (+81)3-5561-5047; *e-mail:* info@elsevier.co.jp].

Asia Pacific *(excluding Japan)*: Elsevier Science (Singapore) Pte Ltd, No. 1 Temasek Avenue, 17-01 Millenia Tower, Singapore 039192 [*Tel.:* (+65)434-3727; *Fax:* (+65)337-2230; *e-mail:* asiainfo@elsevier.com.sg].

Rest of the World: Elsevier Science Customer Service Department, P.O. Box 211, 1001 AE Amsterdam, The Netherlands [*Tel.:* (+31)20-485-3757; *Fax:* (+31)20-485-3432; *e-mail:* nlinfo-f@elsevier.nl].

Periodicals postage paid at Rahway, NJ. *Expert Systems With Applications* (ISSN 0957-4174) is published 8 issues per annum in January, February, April, May, July, August, October and November by Elsevier Science Ltd., The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK. The annual subscription in the USA is US$1287. *Expert Systems With Applications* is distributed by Mercury Airfreight International Ltd., 2323 Randolph Avenue, Avenel, NJ 07001-2413, USA. Postmaster: please send address corrections to *Expert Systems With Applications*, c/o Elsevier Science Regional Sales Office, Customer Support Department, 655 Avenue of the Americas, New York, NY 10010, USA.

VOLUME 12

NUMBER 1

Special Issue:
Intelligent Systems in Industry and Business

	v	Preface
Vijay Rajan **James R. Slagle** **John Dickhaut** **Arijit Mukherji**	1	Decentralized Problem Solving Using the Double Auction Market Institution
Marcus A. Maloof **Ryszard S. Michalski**	11	Learning Symbolic Descriptions of Shape for Object Recognition in X-Ray Images
K. Bechkoum	21	Intelligent Electronic Mock-Up for Concurrent Design
Pietro Baroni **Ulrico Canzi** **Giovanni Guida**	37	Fault Diagnosis Through History Reconstruction: An Application to Power Transmission Networks
Y. Huang **S. Battle** **R. McClatchey** **R. Miles**	53	Comparing Case-Based and Backtrack Search in a Database Application
Byoung-Ho Kang **Young-Lae J. Bae**	65	Binary Character/Graphic Image Extraction Using Fuzzy Inference and Logical Level Methods
Yoshitaka Kuwata **Hiroki Oohama**	71	A Case Study of a Real-Time Problem Solving Strategy in an Air Traffic Control Problem
José M. Sánchez **John W. Priest** **Rogelio Soto**	81	Intelligent Reasoning Assistant for Incorporating Manufacturability Issues into the Design Process
Yong Wang **Naohiro Ishii**	89	A Method of Similarity Metrics for Structured Representations
Carlos Coello Coello **Filiberto Santos Hernández** **Francisco Alonso Farrera**	101	Optimal Design of Reinforced Concrete Beams Using Genetic Algorithms
Richard Fox **Gilbert Ochoa** **Miguel Paredes**	109	Routine Decision Making Using Generic Tasks
Anavai Ramesh **Neil V. Murray**	119	An Application of Non-Clausal Deduction in Diagnosis
Rolf Drechsler **Bernd Becker** **Nicole Göckel**	127	A Genetic Algorithm for RKRO Minimization
Denis Gagné **Wanlin Pang** **André Trudel**	141	A Spatio-Temporal Logic for 2D Multi-Agent Problem Domains
Carlos Rodríguez-Lucatero	147	Evaluation, Existence and Optimization of Reactive Strategies in Motion Planning with Uncertainty

I NTIS Section

III Software Survey Section

NUMBER 2

Huaiqing Wang 153 LearnOOP: An Active Agent-Based Educational System

J. E. Daniels, R. M. Cayton, M. J. Chappell, T. Tjahjadi 163 Cadosa: A Fuzzy Expert System for Differential Diagnosis of Obstructive Sleep Apnoea and Related Conditions

Heng-Li Yang 179 A Simple Coupler to Link Expert Systems with Database Systems

E. Kaszkurewicz, A. Bhaya, N. F. F. Ebecken 189 A Fault Detection and Diagnosis Module for Oil Production Plants in Offshore Platforms

Jae Kyeong Kim, Kyung Sam Park 195 Modeling a Class of Decision Problems Using Artificial Neural Networks

Ding-Lan Shen, Chih-Hung Wu, Shie-Jue Lee 209 EXPIDER: A Channel Routing Expert for VLSI Design

D. Akoumianakis, C. Stephanidis 225 Knowledge-Based Support for User Adapted Interaction Design

N. F. Matsatsinis, M. Doumpos, C. Zopounidis 247 Knowledge Acquisition and Representation for Expert Systems in the Field of Financial Analysis

Gibaek Lee, Kyung Joo Mo, En Sup Yoon 263 The Methodology for Knowledge Base Compression and Robust Diagnosis: Application to a Steam Boiler Plant

I PatentsALERT

VIII NTIS Section

XXII Software Survey Section

XXV Announcement

NUMBER 3

P. Fowler, I. García Martin, N. Juristo, L. Levine, J. L. Morant 275 An Expert System in the Domain of Software Technology Transfer

David R. B. Stockwell 301 Generic Predictive Systems: An Empirical Evaluation Using the Learning Base System (LBS)

Stephen L. Chan **Yongmin Zhang**	311	EMS: An Examination Scheduling and Management System
Huaiqing Wang	323	Intelligent Agent-Assisted Decision Support Systems: Integration of Knowledge Discovery, Knowledge Analysis, and Group Decision Support
F. Alonso **L. Martínez** **C. Montes**	337	SACM: Semantic Agenda Control Model
David J. Finch **Patrick F. Lees**	349	A Hybrid Knowledge-Based System for Chemical Incident Management
Elmamoun Babiker **Dick Simmons** **Robert Shannon** **Newton Ellis**	363	A Model for Reengineering Legacy Expert Systems to Object-Oriented Architecture
Chulsoo Kim **Jae Kyu Lee**	373	UNIK-RELAX: A Generator of the Lagrangian Problem and its Application to the Distributed Database System
Susan J. Chinn **Gregory R. Madey**	393	A Framework for Developing and Evaluating Expert Systems for Temporal Business Applications
	I	NTIS Section
	X	Software Survey Section
	XIII	Announcement

NUMBER 4

P. G. Chander **R. Shinghal** **B. C. Desai** **T. Radhakrishnan**	405	An Expert System to Aid Cataloging and Searching Electronic Documents on Digital Libraries
Brenna O'Roarty **David Patterson** **Stanley McGreal** **Alastair Adair**	417	A Case-Based Reasoning Approach to the Selection of Comparable Evidence for Retail Rent Determination
Yuan Pu Shao	429	The Infusion of Expert Systems in Banking: An Exploratory Study
Hernan Villanueva **Harmeet Lamba**	441	Operator Guidance System for Industrial Plant Supervision
Kyung Joo Mo **Young Seok Oh** **Chang Wook Jeong** **En Sup Yoon**	455	Development of an Operation-Aided System for Chemical Processes
James R. Nolan	465	DISXPERT: A Rule-Based Vocational Rehabilitation Risk Assessment System
Igor Emri **Drago Kovačič**	473	Expert System for Testing Mechanical Properties of Aluminum and Aluminum Alloys

Byoung Y. Lee
Wooju Kim
Jae K. Lee
483 A Knowledge-Based Maintenance of Legacy Systems: METASOFT

R. T. McIvor
M. D. Mulvenna
P. K. Humphreys
497 A Hybrid Knowledge-Based System for Strategic Purchasing

I NTIS Section

VII Software Survey Section

X Announcement

AUTHOR INDEX

Adair A., 417
Akoumianakis D., 225
Alonso F., 337

Babiker E., 363
Bae Y.-L. J., 65
Baroni P., 37
Battle S., 53
Bechkoum K., 21
Becker F., 127
Bhaya A., 189

Canzi U., 37
Chan S. L., 311
Chander P. G., 405
Chappell M. J., 163
Cayton R. M., 163
Chinn S. J., 393
Coello C. C., 101

Daniels J. E., 163
Desai B. C., 405
Dickhaut J., 1
Doumpos M., 247
Drechsler R., 127

Ebecken N. F. F., 189
Ellis N., 363
Emri I., 473

Farrera F. A. 101
Finch D. J., 349
Fowler P., 275
Fox R., 109

Gagné D., 141
Göckel N., 127
Guida G., 37

Hernández F. S., 101
Huang Y., 53
Humphreys P. K., 497

Ishii N., 89

Jeong C. W., 455
Juristo N., 275

Kang B.-H., 65
Kaszkurewicz E., 189
Kim C., 373
Kim J. K., 195
Kim W., 483
Kovačíč D., 473
Kuwata Y., 71

Lamba H., 441
Lee B. Y., 483
Lee G., 263
Lee J. K., 373, 483
Lee S.-J., 209
Lees P. F., 349
Levine L., 275

Madey G. R., 393
Maloof M. A., 11
Martin I. G., 275
Martínez L., 337
Matsatsinis N. F., 247
McClatchey R., 53
McGreal S., 417
McIvor R. T., 497
Michalski R. S., 11
Miles R., 53
Mo K. J., 263, 455
Montes C., 337
Morant J. L., 275
Mukherji A., 1
Mulvenna M. D., 497
Murray N. V., 119

Nolan J. R., 465

Ochoa G., 109
Oh Y. S., 455

Oohama H., 71
O'Roarty B., 417

Pang W., 141
Paredes M., 109
Park K. S., 195
Patterson D., 417
Priest J. W., 81

Radhakrishnan T., 405
Rajan V., 1
Ramesh A., 119
Rodriguez-Lucatero C., 147

Sánchez J. M., 81
Shao Y. P., 429
Shannon R., 363
Shen D.-L., 209
Shinghal R., 405
Simmons D., 363
Slagle J. R., 1
Soto R., 81
Stephanidis C., 225
Stockwell D. R. B., 301

Tjahjadi T., 163
Trudel A., 141

Villanueva H., 441

Wang H., 153, 323
Wang Y., 89
Wu C.-H., 209

Yang H.-L., 179
Yoon E. S., 263, 455

Zhang Y., 311
Zopounidis C., 247

Typeset in Great Britain by Apek Typesetters Ltd, Nailsea, Bristol. Printed by The Alden Press, Oxford.

• BACK ISSUES OF • THIS JOURNAL

Back issues of this and all other Elsevier Science journals are available in hard copy. New subscribers to a journal may purchase back issues of that publication in hard copy edition at 25% discount off the standard price. Elsevier Science maintains stocks of back issues and orders may be placed with confidence at your nearest Elsevier Science office. Should any issue of a volume be temporarily out of stock at the time of ordering, a high quality photoduplicated copy will be supplied at no extra charge to complete your order.

SAVE UP TO 25% BY PURCHASING COMPLETE SETS
Customers wishing to purchase complete sets can do so at a saving of 25% off the individual volume price.

MICROFORM EDITIONS
Back issues in microform of Elsevier Science research journals are also available. For further information please apply to your nearest Elsevier Science office.

BACK ISSUES PRICE LIST
Full details of the rates of back issues of all Elsevier Science journals can be found in our Back Issues Price List. Please contact your nearest Elsevier Science office for a copy.

ELSEVIER
SCIENCE

Elsevier Science, Regional Sales Office, Customer Support Department, PO Box 211,
1000 AE Amsterdam, The Netherlands
• Telephone: +31 20-4853757 • Fax: +31 20-4853432 • E-mail: nlinfo-f@elsevier.nl

Elsevier Science, Regional Sales Office, Customer Support Department,
655 Ave of the Americas, New York, NY 10010, USA
• Telephone: +1-212-633-3730 • Fax: +1-212-633-3680 • E-mail: usinfo-f@elsevier.com

C07A05/p2